



**Research
Development
and Technology
Division**

Missouri
Department
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Mirror Mounted Pavement Temperature Sensors

Description:

The Missouri Department of Transportation (MoDOT) became aware of the importance of pavement temperatures during the SHRP research pertaining to anti-icing practices. In the past, operators have had to depend on the weather forecast, and maintenance building and bank thermometers for their data. These sources provide air temperatures rather than pavement surface temperatures. Our study was to determine if the pavement temperature sensor would be beneficial in identifying the most efficient pavement temperature for applying salt brine or other anti-icing techniques. The RW-1 Roadwatch Infrared sensor was chosen for our study. Laboratory tests prove these units were accurate as advertised $\pm 1^{\circ}$ between 38°F and 5°F. This sensor allowed the operator to observe actual pavement temperatures and trends, and adjust application rates based on real time data. This research unit project placed 50 mirror mounted pavement temperature sensors throughout the state for field use. An additional 125 units have been purchased. They were an immediate success based on operator feedback and district findings.

Advantages / Disadvantages:

Based on the accuracy by the laboratory results and field operator comments, real time pavement temperatures assist the operator in determining proper application rates and times. During the first winter, District One saved \$26,946 due to the reduction or elimination of applications that were not appropriate. This translates into \$186,469 savings state wide based on each District's salt usage.

The disadvantage to the mirror mounted pavement temperature sensor is it reads what it sees, therefore if the roadway surface becomes covered with snow or ice, it reads the snow or ice in lieu of the pavement temperature. This requires the operator to clear a portion of the pavement so that the accurate pavement temperature can be obtained.

Cost:

The mirror mounted pavement temperature sensors used for the test cost \$390 each. The state wide benefit / cost ratio is 9.56 based on a one year life, which will improve as soon as the sensor service life is determined (possibly three to four times greater).

Conclusions:

Districts throughout the state bought an additional 125 units, which indicated the benefits recognized by field personnel. During a recent trip to Champaign, Illinois, we heard a presentation from a snow plow operator from Minnesota DOT on salt solutions. He concluded that the most important addition to the toolbox of a snow plow operator following a plow and spreader is a mirror mounted pavement temperature sensor. We agree with this conclusion. Either by sensor or radio communication, all snow plow operators should have access to real time pavement temperature.

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